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PHYSIOLOGY.¹

BENEKE ON CHOLESTERIN.—In the Proceedings of the Society for the Promotion of the Natural Sciences of Marburg, Prussia, for the years 1880 and 1881, Professor Beneke writes upon the role played by cholesterol in the brain of man. In the brain of a boy of fifteen, who died of phthisis, he found cholesterol to the extent of 2.34 per cent. of the fresh substance, and in that of a girl of nineteen who died of puerperal fever he found 2.13 per cent.

The presence of the substance in so large a quantity, militates, in the writer's belief, against its excrementitious nature, and tends rather to prove that it is "essential to the constitution of the protoplasmic matter of the structure of the tissues." It is present in both cerebrum and cerebellum.

In a second article, Professor Beneke gives further particulars of his investigations into the nature of cholesterol, and states his belief that the cilia of epithelium and of spermatozoa, the "cytozoa" of Dr. Gaule, the "spirilla" of Arndt, and the myelin threads (myelin-fäden) which he found to be procurable from carcinoma cells treated with alcohol, and form an alcoholic extract of blood corpuscles, constitute a connected series of similar objects having a common origin, and that in their production cholesterol plays an important part.

A CORRECTION.—In the September number of the NATURALIST, p. 744, seventh line from the bottom, I am credited with the statement that the part of the segmentation cavity which extends beneath the head of teleostean embryos is converted into the heart. This statement I repudiate; never having made it. What should have been said, by one familiar with my work on Tylosurus and Cybium, is as follows: The heart at first descends into this space, and in those forms in which the development of the heart may be traced in the living embryo, it appears as if the heart grew down into the segmentation cavity, guarded or fringed at its posterior or venous end by the posterior pericardiac membrane. This last point is elaborated in my last paper on the process of yolk absorption in *Alosa sapidissima* and will shortly be published in the Bulletin of the U. S. Fish Commission. In that paper I think I have conclusively shown that the posterior pericardiac membrane or septum, which at a later stage divides the pericardiac chamber from the body cavity is, in some species at least, often perforate or imperfect, or else, as in the clupeoids (*Alosa* and *Pomolobus*), the heart at its hinder or venous end is actually attached to the pericardiac septum by the ends of the walls of the venous sinus which opens directly into the segmentation cavity through a wide perforation in the septum itself. In this wise it results that the cardiac cavity is placed in direct communication with the serous space or segmentation cavity surrounding the yolk, and from the surface

¹This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.

of the *yelk hypoblast* (a thick structureless membrane with scattered proliferating nuclei embedded in it), the blood cells are directly budded off and pumped up by the heart into the circulation. This yelk hypoblast enters into the formation of no structures which can be discovered except blood cells. It is, in fact, the apparatus by which the yelk is broken down into corpuscles, and cannot enter into the development of the intestine, liver, pancreas, segmental organs or other viscera, as these have, at the stage I am discussing, already appeared. The only office it therefore has is a yelk-elaborating function, the yelk substance being incorporated into the body of the nascent fish by the ordinary metabolic processes of growth; the circulation only functioning, as the carrier of the material, the yelk hypoblast is therefore also an evanescent structure. These facts I have mainly observed in living material, afterwards studying the yelk hypoblast more carefully in sections. Kupffer and Gensch have noticed similar phenomena in teleosts, but have not apparently had the good fortune to witness the actual process of germination of the colorless primitive blood cells in the living embryo, as has been done by the writer. As might have been anticipated these early blood cells are colorless. This is in accord with what has been noted in the development of the blood of vertebrates much higher in the scale of organization. No writer on development, as far as I can discover, has hitherto recorded the fact that he has observed this communication of the heart with the segmentation cavity, such as may be seen in the just-hatched embryos of *Alosa*.—*J. A. Ryder.*

SENSE OF COLOR IN CEPHALOPODA.—C. Keller brings forward evidence, states the Journal of the Royal Microscopical Society, that the cuttle-fish manifests in a high degree the power of adapting the color of their skin to that of the environment. He was able to observe this adaptation of color in *Eledone*. In the Naples aquarium, a specimen of this octopod was under the necessity of escaping from a powerful lobster; during its flight, it appeared pale red; but subsequently, resting on a tuft of yellow rock covered with brown spots, resembled it so closely that it became almost invisible to the observer. In this case the conditions were decidedly very favorable for the occurrence, for yellow and dark-brown color cells occur in *Eledone* in large numbers. It should be added that the eye of the cuttle-fish shows an unusually high development.

PHYSIOLOGICAL NEWS.—Professor Wagener contributes¹ his researches upon the origin of the transverse striæ of muscles.—Professor Lieberkuhn gives a notice of the results of his studies of the germinal layers in the mammals, especially the mole and the porpoise (*Meerschwein*). The yelk-cells enter into the structure of the ectoderm, as well as of the endoderm.—Dr. Strahl

¹ Proc. Soc. Promotion of Natural Sciences, Marburg.

writes upon the myloënteric canal of lizards, confirming the existence of a communication between the nerve canal and intestinal tract. The cells of the wall of the former pass directly into the endoderm of the latter in the young embryo, but the connection is obliterated in more advanced ones.—Professor Lieberkuhn treats of metaplastic and neoplastic ossification, as exhibited in the limb-bones of *Chelonia midas*.

PSYCHOLOGY.

TEACHING BRUTES THE USE OF LETTERS.—The purpose of this article is to set forth briefly some thoughts upon a subject which appears to me to have been unaccountably neglected, considering the promise it presents of remarkable, and possibly practical, results.

It is manifest to all who are conversant with the subject, that instinct coöperates with reason in man to a far greater degree than was heretofore supposed, and that in early infancy it dominates; for it is impossible to deny the absolute automatism of the act of the child in obtaining nourishment in the natural manner.

Nor do I believe that the thoughtful and observing can deny that the brutes are capable of reasoning; that is, the apprehension of a logical sequence.

Candor, therefore, compels an admission of the truth that the difference between the mind of man and that of brutes is simply one of degree. It is also admitted that there is no reason to believe that the senses of their higher orders differ materially from those of man, save in some superadded refinements, the nature of which we can only conjecture.

Any investigation into the scope of their mental action, however, is embarrassed by the fact that the most intelligent and tractable are restricted in their power of communicating their ideas and desires to man, to a few simple signs and sounds which they have learned or invented, or derived through inheritance; and while our speech is heard and undoubtedly understood by them, they are practically dumb to us. They should be regarded therefore, as intelligent beings incapable of speech, and treated accordingly.

Now when we consider the apparently hopeless task (which has nevertheless been accomplished) of educating a person who was both deaf and blind;¹ the teaching of an intelligent dog, for example, the use of letters, would not seem to present insuperable difficulties, yet I have never heard of it having been attempted in a scientific spirit. I have seen some surprising feats of learned dogs and pigs, but have always understood that the master or a confederate, by some trick indicated to the animal the card containing the correct letter.

It is true that in a person devoid of the senses, there is neverthe-

¹ See life of Laura D. Fridgman, who lost sight and hearing by disease, when about two years of age.

less the brain full of inherited capacity for apprehension, yet when we close the avenues of sight and hearing, how inaccessible it becomes.

When we consider the immense variety that exists among our domestic animals, a large proportion of which is undoubtedly due to the application by man of the laws of heredity in breeding; and that too in an unenlightened manner; can it be doubted that the application of these laws, as now understood, to a race of dogs, for example, with the view of increasing their general intelligence, would result in something far more wonderful than a retriever or blood-hound.

It cannot be doubted that an intelligent dog is capable of distinguishing between the letters of the alphabet if of a good size and printed upon separate cards. The step between the recognition of the individual characteristics of a number of symbols and the ability to associate them with their respective sounds is not a great one. Then come words; certain symbols set in a certain order.

Having arrived at this stage, which, in view of the facts, would seem by no means impossible, the next task would be to establish the connection between familiar objects with short names, and their names spelled with the cards. The cards being arranged in alphabetical order, the dog would be taught to select the proper letters and place them in the proper order to spell the name of an object shown, without it being spoken. To save time, the *word method* might be adopted, a word being printed upon each card and taught as a simple, and not composite, symbol of the thing it represents.

From this point onward the investigation would become absorbingly interesting; how far the brute mind could understand and express a relationship between two or more objects, as a ball under a hat; a shoe on a box under a table, &c., would come next, and would lead the way to the qualifying function of adjectives.

This much accomplished, it would then be the province of an ingenious investigator to devise plans for bringing to the notice of his pupils abstract ideas; first simple ones, as heat and cold; then more complex, as kindness, friendship, &c. This might be impossible even with the most ingenious methods, yet it would be presumptuous to pronounce it so with our present knowledge of brute intelligence.

Then, too, it would be most interesting to note the operation of heredity upon the function of the brain in a race of creatures not subject to the vicissitudes of human life, and ruled by an intelligent hand.

I cannot but believe that ere long such an inquiry will be demanded, to throw light upon this important subject, and if possible, ascertain the limits of the capabilities of our dumb companions.—*Wm. B. Cooper.*

THE HABITS OF A CAGED ROBIN.—I have a pet robin nearly eleven years old which fell from his nest before he was fledged, and so happy is he in his confinement, that he has never been known to beat against the wires of his cage. At first he was fed upon earthworms, spiders and such larvæ as we could obtain, but one day, such fare being scarce, we tried beefsteak, and found he relished it well, then bread, crackers, bread and milk, cake, &c., till for the last ten years his "living" has been anything usually found on the family table. Indeed, he has come to scorn common robins' food, save meal and cut-worms, spiders and flies. During his first winter, when the cook would be frying doughnuts, as soon as the heating lard began to smell, we noticed a peculiar teasing note, uttered only when wishing some new food. This led us to offer him a bit of hot doughnut, which he relished greatly, and the hotter the better, he eating it whilst quite too warm to hold in one's hand. As a farther test of his power of scent, we found that as soon as a paper of raisins, citron, or such fruits was brought into the dining-room, he began to tease, detecting the fruits as a cat detects the arrival of steak, while it is still wrapped in the paper. For any kind of cooked meat, save mutton, whether fresh or corned, he has a manifest relish.

In the hot summer days, when his food becomes too dry to suit him, it is his habit to carry it to the opposite end of the cage and dip it repeatedly in his bathing dish. As a result of this soft diet, and little or no gravel, his bill has a projection upon it fully three-sixteenths of an inch long, giving him quite a rapacious look, and his toe-nails have repeatedly become so long that he has hung himself on his perch, thus necessitating frequent clippings; now the nails of his hind toes, if straightened, would be more than an inch long.

In the summer he bathes five or six times daily, indeed it sometimes seems as though we could keep him in the water most of the time by refilling his bath-tub and stirring the water a little to call his attention; often his last bath is after tea, and his good night song is generally by gas-light. In early winter he frequently sings till 10 P.M. In January and February his notes are very soft and musical, becoming louder and louder as the season advances (we often have to cover him up to check his noise) till the last of June, when during the molting season he is perfectly silent, save a chirp with which he always greets the family. Indeed, if any of us chance to pass through the room in the night, be it ever so dark, he always welcomes our foot-steps, and with this chirp announces, too, the ringing of the door-bell, often hearing it when from its distance we do not.

Never having been with other robins, and frequently hearing the piano, his notes were a jargon of almost everything, till the usual inquiry of passers-by was: "What kind of a bird is that, a parrot, mocking-bird, or what?" And they were greatly surprised

to know it was only a common red-breast. The last three years the piano has been silent much of the time, and he has quite forgotten the songs he once followed, though still his notes are by no means those of the ordinary robin.

For his wild congeners he has never manifested any regard, and though when hanging out of doors they would sometimes perch upon his cage, especially the female robins, he never seemed to notice them. For persons he has always manifested an unquestionable preference, seldom changing his first impressions even upon acquaintance, and after being courted to do so by tempting morsels. To those he likes he will bring any loose thing at hand, but to others he utters a peculiarly sharp *quip, quip!* runs into the opposite corner of his cage, turns his back and looks decidedly indignant. Further, when singing, if such an one enters, he stops immediately. His memory of persons is perhaps the most remarkable thing about him. We had a servant girl some four years ago for whom he formed a very strong attachment, replying to her voice whenever he heard it, near or far, by another particular note, and when she came to him by going through with a great many funny antics. He had not seen her for three years, and had not made those sounds nor motions. Recently she called and said she wondered if "Fred" would remember her; sure enough, the first sound of her voice and glimpse of her presence revived his former habit, and he could not do enough for her. Is there anything beyond instinct in this?

Occasionally we let him out with a number of other birds in the sitting-room, and though so wise and so old, he has no courage to defend himself, being driven by even a little canary; indeed, he is miserable when out of his cage.

During the molting period there are usually many days when there is no appearance of tail or wing feathers and not more than a half dozen feathers still clinging to his head and neck. Whether this shedding of so many at once is the result of his peculiar food and life, I cannot say, but it is almost always so. He does not seem to be more delicate about his food, drink and bathing at these times than others.

He has never indicated any disposition to migrate, or even an uneasiness in the fall months; indeed, almost the only wild instinct manifested has been nest-building, tearing his paper into shreds and carrying them about, but not depositing them in any one place; nor does he incline to carry about bits of moist earth when they are put in his cage, as wild robins do. Though nearly eleven years old his feathers are as glossy as ever, and deeper in tint than those of his wild mates.—*Mary E. Holmes.*

THE NESTING OF THE BLACK AND WHITE CREEPER.—Birds, as well as men, are strongly affected by exterior circumstances and surroundings. Thus their habits, numbers or even individual presence in any specified district are not constant, but subject to

variation. In whatever sphere the scientist may direct his investigations he finds the word *change* engraven upon each object. This is especially marked in animate nature, and so reveals its presence in the feathered creation by readily observed effects. The agents through whose operation, either singly or collectively, this is traceable, are both numerous and varied. Civilization has modified or entirely changed the architectural structure of the nests of the barn and cliff swallow, &c. Peculiar surroundings leave their impress in certain departures from the general characteristics of any species, *e. g.*, purple grackles inland construct their nests of weeds, sticks, &c., whereas their relatives near the sea shore confine themselves almost entirely to eel grass in building their homes. But again, it sometimes occurs that members of the same species under almost identical exterior surroundings will still evince great inconstancy with no tenable explanation to account for the fact. The black and white creeper (*Mniotilta varia*) affords an illustration of this. There has been more or less controversy regarding the nest of this species. A plain, careful statement of facts alone are of value in all such cases. Many writers who are the theoretical exponents of the erratic or capricious habits of various members of the ornithological kingdom practically ignore all this and farther statements so positive and sweeping in their nature as to exclude the recognition of actual conditions of adverse nature, which obtain in another's personal experience. The result is, you are either compelled to doubt phenomena which have come under your own investigation, or else are led to question the accuracy, and so the value of any or all statements which emanate from such sources. But with all this, we have very little to do in the present article, which is intended to merely give the writer's experience regarding the nesting of this species and referring the reader to the statements of Drs. Coues and Brewer, quoted on page 98, of the Land and Game Birds of New England, and also Mr. Minot's own observations on the same page. The statements of Mr. Maynard in "Birds of Eastern North America," and Mr. Samuels in "Birds of New England and adjacent States," may be also consulted at leisure. During the past season, *i. e.*, in the latter part of April, 1882, the writer detected a pair of black and white creepers busily engaged in excavating for a nest in a white birch stump about five feet from the ground. The location was a clump of trees in a peaty swamp in Middlesex county, New Jersey. After having carefully and with much interest watched their mode of procedure, &c., we departed to return and pay them another visit, which occurred about ten days subsequent to our first discovery. The cavity was now examined and found completed, though no eggs had as yet been deposited in it. The owners of this snug home fluttered near us, evincing their displeasure and anxiety at our unwonted intrusion in an unmistakable manner. A severe rain

storm occurred in the interval, which elapsed ere our last visit. We now found much to our chagrin and disappointment that the nest was deserted. The spongy wood had absorbed so much water that the floor or lower part of the cavity was flooded, while the walls or sides were wet and soggy. But for this unlooked for severe storm, we should have had the pleasure of beholding a set of black and white creepers' eggs in a hole in a birch stump. Another nest also in a decayed stump contained young birds, when discovered in the latter part of May. In the spring of 1873, a friend, then attendant at the Blairstown Academy, situated in the north of New Jersey, while passing a ledge of rocks, was attracted by a long strip of bark depending from a crevice or chink in the rock. Curiosity to know what had carried this piece of bark induced him to examine the spot, the result was the discovery that the piece of bark was a portion of the material used in the construction of the nest of a pair of black and white creepers, the presence of whose home was thus betrayed. Eggs taken from this nest, now in cabinet, have been oft inspected by the writer.

In Indiana, Illinois, &c., persons there residing during visits to friends in New Jersey, have stated that in the West the black and white creeper not unfrequently nests in holes in fence rails, posts and like places, and by request have kindly expressed eggs taken from these situations. While, therefore, we do not say that this species does not nest upon the ground very often, we do state that we have as yet not so found the nest, though many others have. We also state that we have known them to nest in holes in trees, crevices in rocks, cavities in stakes, posts, &c. And finally we surmise that were it practicable, personal investigation is the better criterion in all mooted questions.—*A. G. Van Aken.*

A BEWILDERED SNOW-BIRD.—The night of the 10th instant was cold and rainy, with a high wind—a bad night for man, or bird, or beast, to be abroad. About 9 o'clock, as I sat by the table reading, with my back to the window, I heard a strange muffled rattling on the glass. Looking in the direction whence the sound proceeded, I saw a little bird fluttering up and down, evidently trying to get to the light. Going outside, I readily caught it. The little creature proved to be a snow-bird (*Junco hyemalis*). These birds are quite numerous in this vicinity, but this is the first instance of the kind that has come to my knowledge. I kept the little bird till morning, when I let it go. It flew off to the north, rising at an angle of about forty-five degrees, until it finally disappeared.—*Charles Aldrich, Webster City, Iowa, Nov. 12, 1882.*

A TOAD'S CUNNING.—Charles White, of New Castle, has a brood of chickens which have the run of a portion of the yard, the old hen being kept shut up. The chickens are fed with moistened meal, in saucers, and when the dough gets a little sour, it attracts large numbers of flies. An observant toad has evidently noticed this, and every day, along toward evening, he makes his appear-

ance in the yard, hops to a saucer, climbs in, and rolls over and over until he is covered with meal, having done which, he awaits developments. The flies enticed by the smell, soon swarm around the scheming batrachian, and whenever one passes within two inches or so of his nose, his tongue darts out and the fly disappears; and this plan works so well that the toad has taken it up as a regular business. The chickens do not manifest the least alarm at their clumsy and big-mouthed playmate, but seem to consider it quite a lark to gather around him and peck off his stolen meal, even when they have plenty more of the same sort in the saucers.—*New Hampshire Gazette*.

ANTHROPOLOGY.¹

DISCOVERY OF MOUND RELICS AT DEVIL RIVER, LAKE HURON.—Excavations made by me, last summer, in mounds at Devil river, on the west shore of Lake Huron, were rewarded by the discovery of many interesting relics. These principally consisted of the various parts of the human skeleton, together with fragmentary pottery. Among the former, flattened (platycnemic) tibiae were abundant, also femora with expanded extremities (chiefly developed at the popliteal space), such as have been already described as found by me in the mounds of the Detroit river. Associated with these were humeri in which the lamina of bone ordinarily separating the olecranon and coronoid fossae is partially obliterated or is perforated. The crania are of the orthocephalic type, bearing near resemblance to those of the same type from the mounds near Detroit. In all of them the occipital foramen is situated decidedly backwards. Most of the bones were in the more advanced stages of decay, and generally crumbled to pieces in the effort to secure them. But few stone implements were exhumed, and those were mostly of flint. Pottery was in large quantities, and though in fragments, evidently presented a great variety of shapes, being ornamented with indented designs, among which the cord pattern, as usual, predominated. A part of the perforated stem of a pipe, formed of clay, was among the relics. On the mounds originally stood pine trees (*Pinus strobus* L.), which must have been at least two hundred years old. The stumps of these, in numerous instances, remained, the great roots spreading in all directions above the bones and other relics, showing that the trees must have sprung up and attained their growth long subsequently to the burials.

On the low ground, toward the mouth of the river, is an ancient Manitou rock. It is a granite boulder and is deeply sunk in the earth; the part protruding being an angle rising only about a foot above ground, five feet long by two feet broad. Here, until the last six years, the modern Indians (of the Ojibway tribe) came annually in the autumn, in considerable numbers, to offer their votive gifts, which were deposited upon the rocks

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